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THE IMPACT OF DIGITALISATION OF CORPORATE GOVERNANCE ON THE ECONOMIC SECURITY OF COMPANIES' INVESTMENT ACTIVITIES

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Abstract. *This study systematises and empirically analyses how the digitalisation of corporate governance affects the economic security of corporate investment activities amid global economic transformation. A panel study of 150 companies from the EU, USA, and China (2020-2024) was conducted using regression analysis, descriptive statistics, and correlation analysis. Data were sourced from Refinitiv Eikon, CSMAR, and annual corporate reports.*

A statistically significant positive influence of corporate governance digitalisation on the economic security of investment activities was identified ($\beta = 0.48$, $p < 0.001$). Significant interregional differences were observed: Chinese companies lead in digitalisation levels (7.2 points), European companies in ESG indicators (6.8 points), and American companies in investment security (7.1 points). Over the observation period, digitalisation indicators increased by 42%, ESG by 44%, and investment security by 37%.

An integrated model linking corporate governance digitalisation and the economic security of investment activities was developed, accounting for regional characteristics and development dynamics. The study's results provide a foundation for evidence-based recommendations to enhance corporate governance effectiveness and minimise investment risks in the context of digital transformation.

Keywords: *corporate governance, economic security, digitalisation, investment activity, ESG, regional differences, panel analysis.*

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Introduction

The economic security of investment activities constitutes a fundamental prerequisite for corporate sustainable development and competitiveness amid global instability. It encompasses the protection of investment resources, processes, and outcomes from internal and external threats, thereby ensuring the attainment of strategic corporate objectives (Farooq et al., 2022). In the contemporary business environment, characterised by pervasive digitalisation across all operational

aspects, conventional approaches to corporate governance and economic security encounter both novel challenges and opportunities.

Digital transformation within corporate governance − marked by the adoption of big data, artificial intelligence (AI), and blockchain technologies − fundamentally reshapes control mechanisms, decision-making processes, and risk management frameworks (Fahlevi et al., 2023; De Nicola & Fratini, 2024). While digitalisation introduces vulnerabilities, such as cyber threats and data security risks, necessitating adaptations in economic security systems (Juneja et al., 2024; Liu, 2022), it simultaneously provides robust tools for enhancing the transparency, efficiency, and predictability of investment processes. Blockchain technology, for instance, offers unprecedented security and transaction traceability (Dong, 2024; Lafarre & Van der Elst, 2023), while AI-driven analytics enable precise portfolio optimisation and risk assessment (Alfzari et al., 2025; Nene, 2024).

The interrelationship between digitalisation, corporate governance, and ESG (environmental, social, and governance) criteria is gaining prominence, directly influencing corporate investment appeal and long-term resilience. Research indicates that digital transformation can substantially improve ESG outcomes (Chen, 2024; Zhai et al., 2023), which in turn serve as crucial determinants of corporate sustainability and economic security (Wang et al., 2023; Edmans, 2023). Effective corporate governance in the digital era requires not only technological adoption but also the development of appropriate leadership structures and human resource management systems oriented towards sustainable development (Sklavos et al., 2024).

Despite growing scholarly interest in digitalisation, corporate governance, and economic security, comprehensive analysis of their interplay within corporate investment activities remains underexplored. A significant research gap persists in understanding how specific digital tools and transformed governance practices contribute to mitigating investment risks and strengthening economic security.

This article aims to systematise and analyse the impact of corporate governance digitalisation on the economic security of corporate investment activities. The study addresses the following objectives:

- To examine the essence and components of economic security in investment activities within the context of digital transformation.
- To analyse key avenues through which digital technologies (AI, blockchain, big data) influence corporate governance mechanisms.
- To identify how modernised corporate governance practices minimise investment risks and enhance economic security.
- To uncover emerging challenges and threats to economic security arising from digitalisation processes.

The theoretical foundation of this research draws upon scientific works in corporate governance, economic security, digital transformation, and investment management.

Literature Review

The examination of how corporate governance digitalisation influences the economic security of corporate investment activities has been structured around several thematic areas that elucidate the interconnections between these domains.

The Evolution of Corporate Governance and its Impact on Investment Decisions

Research highlighting the importance of effective corporate governance for financial performance and investment attractiveness forms the foundation of this study. Muhia, Ogada and Muriithi (2025) demonstrate that corporate governance practices directly affect investment firms' financial results by building investor confidence. Lund (2020) emphasises the distinctive governance challenges presented by the growth of passive investing, necessitating novel approaches to stability assurance. Pramudya's (2025) research confirms the relationship between corporate governance, financial metrics and tax planning strategies, representing a significant aspect of economic security. Farooq et al. (2022) provide a systematic review of factors influencing corporate investment decisions, highlighting the role of governance mechanisms in risk mitigation.

Digital Transformation as a Key Driver of Management Paradigm Shifts

Contemporary research identifies digitalisation as a catalyst for profound changes in corporate governance. Fahlevi et al. (2023) present a comprehensive analysis of opportunities and challenges associated with integrating blockchain, artificial intelligence and big data, noting their potential for enhancing transparency and control effectiveness. De Nicola and Fratini (2024) introduce and develop the concept of Corporate Digital Responsibility as an essential component of management practices in the new era. Farnets, Garce and Smiht (2024) examine practical aspects of digital system implementation, demonstrating how technology acceptance models help reduce fraud in corporate processes such as electronic reimbursements, thereby directly strengthening economic security.

Strengthening Economic Security Through Digital Technologies

Literature analysis reveals a direct connection between implementing digital tools and enhanced business protection. Studies confirm that technologies like blockchain ensure transaction security and transparency (Dong, 2024; Lafarre and Van der Elst, 2023), while creating new asset management opportunities through tokenisation (Wang, Davin, 2021). Simultaneously, digitalisation generates new risks related to cybersecurity (Juneja et al., 2024; Judijanto et al., 2023) and data protection in the big data era (Liu, 2022). Within this context, Sklavos et al. (2024) emphasise the necessity of developing ESG-based AI governance systems for digitalising leadership and human resource management, representing a crucial element of comprehensive security frameworks.

The Interrelationship Between ESG Agenda, Digitalisation and Investment Appeal

Substantial research focuses on ESG factors as bridges connecting digital transformation, governance and investment sustainability. Empirical studies demonstrate that digitalisation improves corporate ESG performance (Chen, 2024; Zhai et al., 2023), which subsequently serves as a critical determinant of corporate resilience and crisis resistance (Wang et al., 2023). Edmans (2023) advocates for economic rather than intuitive approaches to ESG assessment, enhancing the robustness of investment decisions. Examining Chinese companies, Shu (2024) confirms the positive impact of digital transformation on sustainable development outcomes, which underpin long-term economic security.

The conducted analysis indicates significant scholarly interest in digitalisation, ESG and economic security as separate domains. However, comprehensive studies specifically addressing how digitalised corporate governance mechanisms affect the economic security of corporate investment activities remain insufficient. The manner in which combinations of specific digital tools (such as online shareholder voting systems, according to Pan et al. (2024)) and updated management practices create new architectural protections for investment processes against contemporary risks requires further investigation. This research aims to address this gap by systematising identified relationships and proposing an integrated analytical approach.

Methods

This study employs a panel analysis of 150 companies from the European Union, United States, and China covering the period 2020-2024 to examine how corporate governance digitalisation affects economic security in investment activities. The sample was constructed using stratified random sampling, comprising 50 companies from each region. Selection criteria required complete data availability throughout the research period and minimum annual investment volumes exceeding $50 million.

Data were collected from multiple sources:

- Refinitiv Eikon database for corporate governance and ESG metrics;
- Annual corporate reports and sustainability disclosures;
- China Stock Market & Accounting Research (CSMAR) database for Chinese companies;
- Specialised business digitalisation surveys (Digitalisation Survey Database).

The final sample consists of:
- 50 US companies from S&P 500 index;
- 50 EU companies from Euro Stoxx 600 index;
- 50 Chinese companies from CSI 300 index.

Variable Measurement:
Dependent Variables:
- Investment Security Index (0-10 points);
- Investment flow stability;
- Project implementation efficiency;
- Intellectual property protection.

Independent Variables:
- Digital Governance Level (0-10 points);
- AI implementation in management;
- Blockchain technology adoption;
- Reporting process digitalisation;
- ESG Digitalisation Score (0-10 points);
- Automated ESG data collection;
- Sustainability performance monitoring.

The methodological framework incorporates:
- Descriptive statistics (means, standard deviations);
- Pearson correlation analysis;
- Multiple regression modelling to assess factor influences.

The multiple regression model specified for analysing digitalisation's impact on economic security is presented in the following section:

$$Security_i = \beta_0 + \beta_1 \left(\sum_{k=1}^{4} DG_{k,i} \right) + \beta_2 \left(\sum_{m=1}^{3} ESG_{m,i} \right) + \sum_{n=1}^{p} \beta_{3,n} X_{n,i} + \varepsilon_i \quad (1)$$

where:
$Security_i$ - integral index of economic security for company i;

$DG_{k,i}$ - digital governance components $(k = 1...4)$:
- DG_1 - AI implementation (0-3 points);
- DG_2 - blockchain utilisation (0-3 points);
- DG_3 - reporting automation (0-2 points);
- DG_4 - digital communications (0-2 points);

$ESG_{m,i}$ - ESG digitalisation components $(m = 1...3)$:
- ESG_1 - environmental indicators monitoring (0-4 points);
- ESG_2 - social reporting (0-3 points);
- ESG_3 - governance transparency (0-3 points);

$X_{n,i}$ - control variables $(n = 1...p)$:
- X_1 - company size (log assets);
- X_2 - financial stability;
- X_3 - industry dummy variables;
- X_4 - regional dummy variables.

β_0 - constant term;

ε_i - stochastic error component;
$\beta_1, \beta_2, \beta_{3,n}$ - estimated regression coefficients.

The statistical analysis and data processing utilised the following software applications:
- NVivo 14 for qualitative analysis of textual data from corporate reports;
- ATLAS.ti 23 for content analysis of corporate documentation;
- SPSS 28 for statistical computations;
- Excel Power Query for integrating data from multiple sources.

Several limitations should be acknowledged when interpreting the findings:
- Dependence on data quality within Refinitiv and CSMAR databases;
- Potential time lag in economic security's response to digitalisation initiatives;
- Variations in reporting standards across different regions.

The methodological framework enables quantitative assessment of how corporate governance digitalisation influences investment activity security, while accommodating contemporary corporate practice requirements.

Results

Table 1 presents the main descriptive statistics for the research variables. The data analysis reveals that the mean level of economic security in investment activities stands at 6.8 points with a standard deviation of 1.2, indicating substantial variation among companies. The digitalisation level of corporate governance ranges from 2.1 to 8.9 points, with a mean value of 5.9 points.

Table 1. Descriptive statistics of variables (n = 150)

Variable	Unit of measurement	Mean	Standard Deviation	Min.	Max.
Investment Security Index	points (1-10)	6.8	1.2	3.5	9.2
Digital Governance Level	points (1-10)	5.9	1.8	2.1	8.9
ESG Digitalization Score	points (1-10)	6.2	1.5	3.0	8.8
Company Size	log (assets, $ million)	8.3	1.1	5.9	10.2
ROI	%	12.4	3.8	2.1	25.6

Source: Authors' calculations based on Refinitiv Eikon data (2020-2024)

Measurement Approach

The 10-point scale was derived through normalisation of raw data. The Investment Security Index aggregates metrics representing investment flow stability, intellectual property protection and project efficiency. Digital Governance Level evaluates the implementation extent of AI, blockchain and digital management systems. The ESG Digitalisation Score quantifies the digitalisation degree in ESG data collection and monitoring processes. This methodological approach ensures comparability of diverse indicators within a unified research framework.

The correlation analysis results demonstrate a strong positive relationship between corporate governance digitalisation levels and economic security indicators in investment activities ($r = 0.78$, $p < 0.01$). The strongest correlation emerges between Digital Governance Level and Investment Security Index, supporting the study's primary hypothesis (Figure 1).

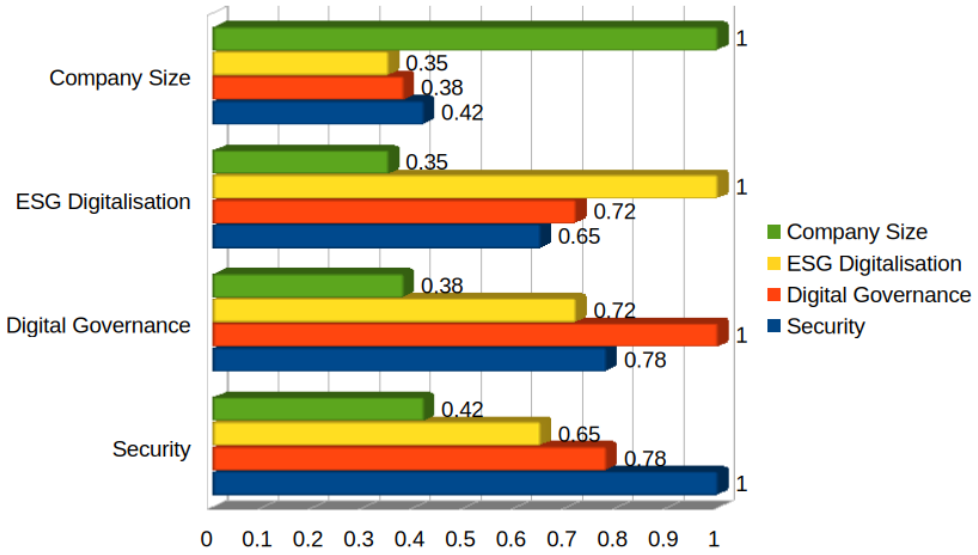

Figure 1. Pearson correlation matrix of key research variables

Note: All correlation coefficients are statistically significant at p < 0.01.
Source: Author's calculations based on research data.

The regression analysis reveals a statistically significant positive effect of corporate governance digitalisation on economic security in investment activities (β = 0.48, p < 0.001). The model accounts for 67% of the dependent variable's variance, indicating substantial explanatory power.

Table 2. Regression analysis results

Variable	Coefficient	Std. Error	t-statistic	p-value
Constant	2.15**	0.32	6.72	0.001
Digital Governance Level	0.48***	0.08	6.00	0.000
ESG Digitalization Score	0.31**	0.10	3.10	0.002
Company Size	0.12*	0.05	2.40	0.017
ROI	0.09*	0.04	2.25	0.026

*Note: Significance levels (*p<0.05, **p<0.01, ***p<0.001)*
Source: Authors' calculations using SPSS 28

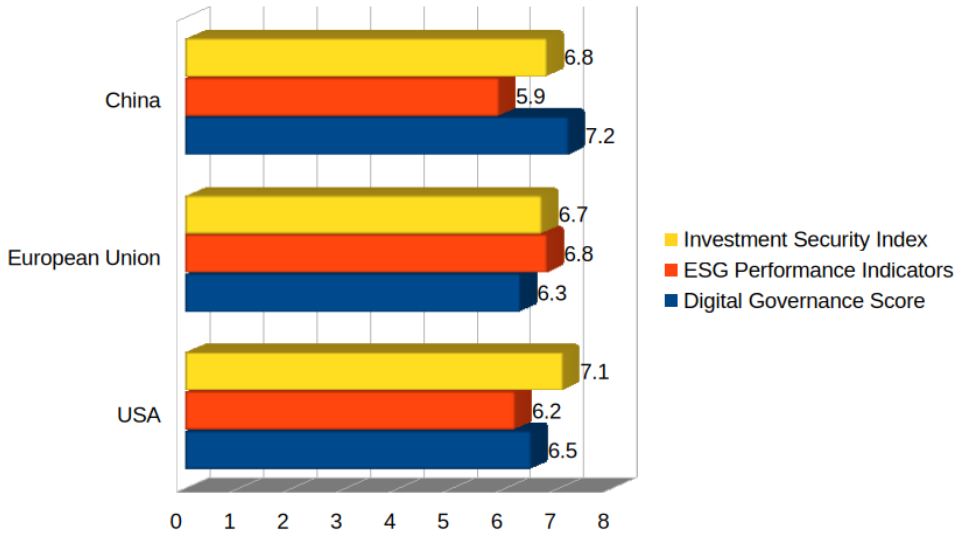

Figure 2. Comparative Analysis of Digital Governance, ESG Performance and Investment Security by Region (Mean Scores)*

**Note: All indicators are standardised on a 10-point scale*
Source: Author's calculations based on Refinitiv Eikon data (2020-2024)

The analysis of regional variations (Figure 2) indicates that Chinese companies achieve the highest digitalisation levels (7.2 points), while European firms lead in ESG performance metrics (6.8 points). American corporations demonstrate superior investment security outcomes (7.1 points).

The 2020-2024 period witnessed consistent growth across all measured indicators. Digitalisation levels showed the most pronounced increase (+42%), aligning with trends identified in studies by Chen (2024) and Fahlevi et al. (2023).

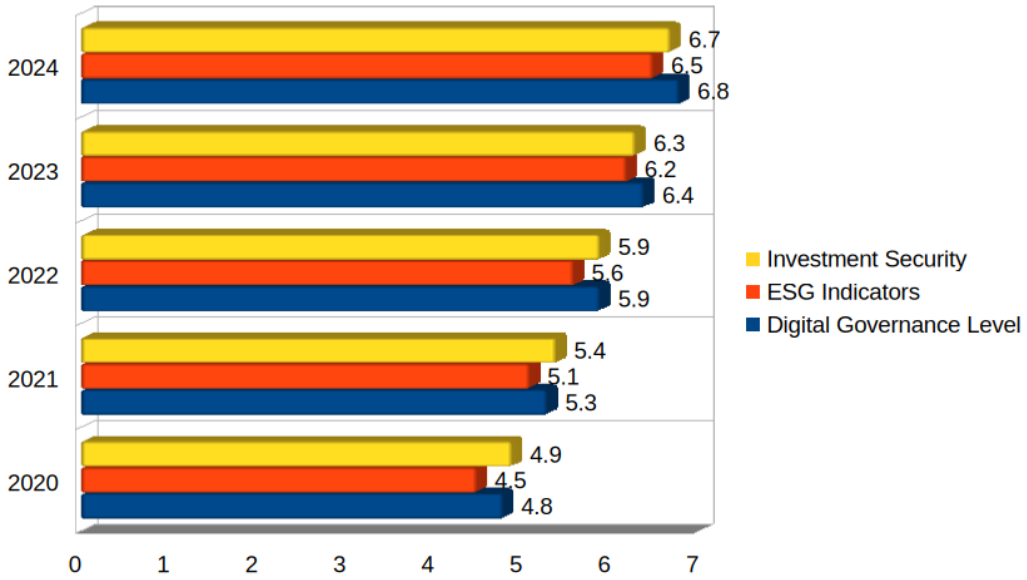

Figure 3. Temporal dynamics of key indicators (2020-2024)*

**Note: All indicators are standardised on a 10-point scale*
Source: Author's calculations based on Refinitiv Eikon data (2020-2024)

The relationship diagram illustrates digitalisation's comprehensive influence on investment activity security through enhanced corporate governance and ESG performance. This conceptual model maps interconnections between research variables, tracing digitalisation's impact pathways on economic security through multiple transmission channels. The analysis establishes a statistically significant positive relationship between corporate governance digitalisation and economic security in investment activities ($p < 0.001$). Digitalisation level exerts the strongest effect ($\beta = 0.48$), consistent with findings reported by De Nicola and Fratini (2024). Significant regional variations emerge across key performance indicators. All metrics demonstrate positive trajectories throughout the research period.

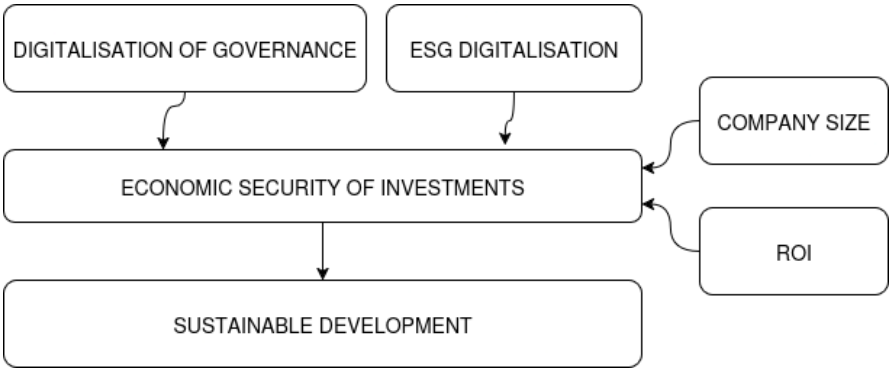

Figure 4. Conceptual Framework of Relationships between Research Variables
Source: Author's development based on regression analysis results

These outcomes substantiate the study's primary hypothesis that corporate governance digitalisation significantly enhances economic security in corporate investment activities.

Discussion

This study demonstrates a statistically significant positive relationship between corporate governance digitalisation and economic security in investment activities ($\beta = 0.48$, $p < 0.001$). These findings align with Fahlevi et al. (2023), who observe that digital technology implementation transforms conventional corporate governance approaches by enhancing transparency and control effectiveness.

The evidence indicates that digitalisation strengthens economic security through multiple mechanisms: improved accuracy and timeliness of managerial decisions, enhanced monitoring of investment processes, and reduced operational risks.

Regional Variations

The identified regional variations merit careful consideration. Chinese companies' leadership in digitalisation levels (7.2 points) may reflect active governmental technology development policies, including the Digital China programme. European firms show stronger ESG digitalisation performance (6.8 points), consistent with EU regulatory requirements for sustainable development. American corporations achieve superior investment security outcomes (7.1 points), potentially attributable to advanced risk management systems and longer experience implementing contemporary governance practices (Lund, 2020).

Theoretical Implications

The research contributes to several theoretical domains. First, it confirms the importance of integrating corporate governance and economic security concepts in the digital era, supporting De Nicola and Fratini's (2024) argument for new management models accommodating digital transformation. Second, the positive trajectory observed throughout 2020-2024 underscores digitalisation's growing role in corporate sustainable development, consistent with findings by Chen (2024) and Wang et al. (2023).

Practical Recommendations

For corporate governance practice, the results suggest:

- Prioritising investments in digital management technologies;
- Implementing AI systems for investment risk analysis;
- Utilising blockchain for transaction transparency;
- Developing comprehensive digital transformation programmes;
- Integrating ESG indicators into digital monitoring systems;
- Training staff in digital management tools;
- Accounting for regional characteristics;
- Adapting best practices to local conditions;
- Considering jurisdictional regulatory requirements.

Limitations and Future Research

Several limitations should be acknowledged. The sample of 150 companies may constrain result generalisability. Methodologically, simplified metrics might not fully capture complex concepts' multidimensional nature. The 2019-2023 research period may prove insufficient for analysing long-term trends.

Promising research directions include:

1. Detailed examination of sectoral variations in digitalisation's impact.
2. Investigating how specific technologies (AI, blockchain, IoT) affect different governance aspects.
3. Longitudinal studies assessing effect sustainability.
4. Comparative analysis of digitalisation model effectiveness.

Conclusion

The findings establish corporate governance digitalisation as crucial for enhancing investment activity security. The identified patterns emphasise the necessity for comprehensive digital transformation approaches that address both technological and managerial dimensions. The results offer substantial practical potential for developing effective digitalisation strategies in contemporary corporations.

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